

SOCIETIES AND ACADEMIES.

LONDON.

Royal Society, January 28.—"The 'Islets of Langerhans' of the Pancreas." By H. H. Dale, M.A., B.C., George Henry Lewes Student. Communicated by Prof. Starling, F.R.S.

Since first described by Langerhans, in 1869, the "islets" have had various functions assigned to them, on the assumption that they are independent structures embedded in the pancreatic tissue, the prevalent view regarding them as ductless glands furnishing an internal secretion necessary for normal carbohydrate metabolism.

Lewaschew and others have stated that intermediate forms exist between the "islets" and the ordinary pancreatic alveoli, and that the abundance of islets and the prevalence of intermediate forms are increased by activity of the gland. Lagnesse described a conversion of secretory alveoli into islets and *vice versa* during embryonic development.

These observations were made on the pancreas of the dog, cat, rabbit and toad, in conditions of rest, exhaustion, starvation, and after ligation of the duct. The tissue was hardened in a sublimate-formaldehyde mixture, cut in paraffin, and stained with toluidine blue and eosine.

In the resting pancreas of all the species examined, the intermediate forms described by Lewaschew were observed, and in the toad indications were found of a reconstruction of alveoli from islets.

In the condition of exhaustion, produced, in the mammalian pancreas, by intravenous injection of secretin during anaesthesia, in that of the toad by hypodermic injection of the same substance, a very extensive conversion of secretory alveoli into "islets" was observed, specimens being obtained from a dog with the greater part of a lobule, from a toad with the greater part of the whole pancreas so converted.

The effect of starvation, observed in a stray cat and in toads from the laboratory tank, was similar, but slighter in degree.

In the dog and rabbit, occlusion of the duct caused an interstitial fibrosis, the areas of tissue not destroyed assuming the "islet" condition. The preformed islets appeared to have no special immunity.

February 4.—"On the Origin of Parasitism in Fungi." By George Massee (Principal Assistant, Herbarium, Royal Gardens, Kew). Communicated by Sir William T. Thiselton-Dyer, K.C.M.G., C.I.E., F.R.S.

The hitherto unexplained problem as to why parasitic fungi are usually confined to one, or at most a few closely allied host-plants is shown to be due to chemotaxis. An extensive series of experiments was conducted with both parasitic and saprophytic fungi for the purpose of determining the positive or negative chemotactic nature of various substances occurring normally in plants. Among such may be enumerated saccharose, glucose, asparagin, malic and oxalic acid, and pectase. Practically the germ tubes of all fungi are positively chemotactic to saccharose, and the reason why all plants containing this substance are not attacked by every kind of fungus is because certain other substances present in the plant are negatively chemotactic or repellent to the germ-tubes.

Immune specimens of plants belonging to species attacked by an obligate parasite owe their immunity to the absence or small proportion of the substance chemotactic to the parasite. This discovery will assist in the production of immune strains of cultivated plants, all previous attempts in this direction having been conducted along lines of physical resistance.

Purely saprophytic fungi can be educated to become parasitic by sowing the spores on a living leaf that has had a substance positively chemotactic to the germ-tubes of the fungus experimented with injected into its tissues. By similar means a parasitic fungus can be led to attack a new host-plant.

These experiments prove what has hitherto only been assumed, namely, that parasitism on the part of fungi is an acquired habit.

Infection occurs more especially during the night or in dull damp weather, owing to the greater turgidity of the

cells and to the presence in excess of the chemotactic substance in the cell-sap.

February 11.—"On Certain Properties of the Silver-Cadmium Series of Alloys." By T. Kirke Rose, D.Sc. Communicated by C. T. Heycock, F.R.S.

The attempts made at the Royal Mint to produce uniform standard trial plates of silver and copper have been unsuccessful owing to the segregation of the constituents. The cooling curve of the alloy shows that solidification begins at 900° and ends at 778° after passing through a pasty stage, during which rearrangement of the constituents can take place, with the result that the uniform distribution of the silver is disturbed. The cooling curve of the alloy containing 92.5 per cent. of silver and 7.5 per cent. of cadmium is found to resemble that of a pure metal, showing no appreciable pasty stage, and on testing plates made of these materials they were found to be uniform in composition. The alloy is exceedingly ductile, and no difficulty is encountered in making assays on it by any of the well-known methods. In preparing large ingots it is necessary to pour silver into a suitable amount of molten cadmium, this method minimising the loss of cadmium by volatilisation. The cooling curves and the microstructure of the whole series of alloys of silver and cadmium have also been studied, and evidence has been obtained of the existence of a number of compounds. The alloys containing from 100 to 80 per cent. of silver are homogeneous at all temperatures below the solidus curve, although they appear to contain two bodies between the solidus and liquidus curves.

"On the High Temperature Standards of the National Physical Laboratory: an Account of a Comparison of Platinum Thermometers and Thermo-junctions with the Gas Thermometer." By J. A. Harker, D.Sc. Communicated by R. T. Glazebrook, F.R.S.

This paper contains an account of a continuation of the work of Dr. P. Chappuis and the author (*Phil. Trans.*, A., 1900) on a comparison of the scale of the gas thermometer with that of certain platinum thermometers, from below zero to 600° C.

The results of this work confirmed the experiments of Callendar and Griffiths, and showed that the indications of the platinum thermometer may be reduced to the normal scale by the aid of Callendar's difference formula

$$d = T - pt = \delta[(T/100)^2 - T/100],$$

where pt is the platinum temperature, T the temperature on the normal scale, and δ a constant which, for pure platinum, is about 1.5.

The temperatures chosen for the determination of δ are 0° C., 100° C., and the boiling point of sulphur.

In the present paper the work is extended to a temperature of 1000° C., a number of standard thermo-junctions of platinum-rhodium being also included in the comparisons.

The gas thermometer employed for this work was presented to the laboratory by Sir Andrew Noble. The bulbs used were of porcelain, glazed inside and out, and the gas used was pure dry nitrogen. The thermo-junctions were carefully compared at a number of fixed points up to 960° C., before use, with concordant results. A special potentiometer designed and made in the laboratory enabled the thermo-junction readings to be taken with great accuracy.

The platinum thermometers employed were one of the three used by Harker and Chappuis in their earlier work, and a new one belonging to the British Association. The different instruments, after determination of their constants, were tested together in specially constructed electric resistance furnaces, heated from a special battery in which temperatures from 400°–1100° C. could be very steadily maintained for considerable periods. Special winding enabled a compensation to be made for the greater cooling effect at the ends of the furnaces, so that over a considerable length the temperature was exceedingly uniform.

The investigation shows that:—

(1) The readings of the platinum thermometers BA₁ and K₂, which may be taken as representative instruments, when reduced to the air scale by the use of Callendar's

difference formula, are, up to a temperature of 1000°C ., in close agreement with the results obtained from the constant volume nitrogen thermometer, employing chemical nitrogen, and using the received value for the dilatation of the Berlin porcelain, of which the bulb is made.

(2) The platinum thermometers agree very closely with a set of thermo-junctions representing the temperature scale of the Reichsanstalt, based on measurements with a gas thermometer having a bulb of platinum-iridium.

As the results of these experiments seem to justify very completely the use of Callendar's parabolic formula over a wide range, a table has been calculated by which the value of T may be obtained directly from the value of pt for a range of temperature extending from -200° – 1100°C ., and for the value 1.5 of the constant δ .

"A New Method of Detecting Electrical Oscillations."

By J. A. Ewing, LL.D., F.R.S., and L. H. Walter.

The paper describes a detector of electrical oscillations suitable for wireless telegraphy. It is based on Ewing's hysteresis tester, and employs the change which electrical oscillations produce in the hysteresis of a magnetic metal exposed to reversals of magnetism by means of a revolving field. The hysteresis causes the magnetic metal to be dragged after the field, and this drag is opposed by a spring, a definite deflection of the metal being thereby produced. When the oscillations act this deflection undergoes a sudden change which constitutes the indication.

Under the conditions first experimented on, the authors found, as they expected, a reduction of the hysteresis deflection when the oscillations acted. But in later experiments, when the magnetic metal was arranged in the form of a fine insulated steel wire through which the electrical oscillations were caused to pass, it was found that they produced a large increase in the deflection.

In the instrument exhibited the revolving field is supplied by an electromagnet with long wedge-shaped pole pieces between which a long bobbin of the steel wire is pivoted, so that the magnetic drag tends to make it turn on its axis. It is controlled by a spring and furnished with a mirror or other indicator of deflection. The bobbin is wound with about 500 turns of No. 46 gauge hard-drawn steel wire, insulated with silk, the winding being non-inductive. It is immersed in oil, which serves to steady the deflection as well as to reinforce the insulation.

The detector gives quantitative readings, and, in some cases, the deflection may be too large to be easily read by the scale. For this purpose a variable shunt is provided, by which the deflection can be regulated.

For the purpose of wireless telegraphy, the instrument has the advantage of giving metrical effects. The benefit of this in facilitating tuning, and in other respects, need not be insisted upon.

From the physical point of view, the augmentation of hysteresis is interesting and unlooked for. It is probably to be ascribed to this, that the oscillatory circular magnetisation facilitates the longitudinal magnetising process, enabling the steel to take up a much larger magnetisation at each reversal than it would otherwise take, and thus indirectly augmenting the hysteresis to such an extent that the direct influence of the oscillations in reducing it is overpowered. The net result appears to be dependent on two antagonistic influences, and, in fine steel wire, under the conditions of the experiments, the influence making for increased hysteresis, as a result of the increased range of magnetic induction, is much the more powerful.

Linnean Society, February 4.—Prof. S. H. Vines, F.R.S., president, in the chair.—Mr. C. E. Salmon exhibited two specimens of *Epilobium collinum*, C. C. Gmel., from Scotland, with a series of *E. montanum* and *E. lanceolatum* for comparison.—The President gave an account of researches into the physiology of the yeast-plant (*Saccharomyces Cerevisiae*). He directed attention to the fact that though this plant consists of but a single minute cell it produces a variety of enzymes or ferments: *diastase*, *invertase*, *glucose*, *zymase*, as well as an undefined enzyme, *protease*, which digests proteid matter. The proteolytic activity of yeast has engaged the attention of many observers, of whom Hahn and Geret express the opinion that the plant contains a protease which resembles,

in some respects, the pepsin of the animal body, in other respects the trypsin. In November, 1902, the discovery of a protease resembling the recently discovered *erepsin* of the animal body was announced by the president. Since then he has endeavoured to determine whether or not the proteolytic phenomena of yeast may not be due in part to the presence of an enzyme of this character, with results which indicate that this is the case. A filtered watery extract of yeast readily decomposes the simpler proteids, such as albumoses and peptones, into non-proteid bodies, such as leucin, tyrosin, &c., as indicated by the tryptophane-reaction. Such an extract was, however, in no case observed to exert any digestive action upon a higher proteid, such as fibrin. The conclusion to be drawn is that the protease extractable from yeast by water is an erepsin. Yeast contains a protease that digests fibrin. If yeast be extracted with a 2 per cent. solution of common salt, a liquid is obtained which digests fibrin with certainty. What, now, is the nature of this protease that digests fibrin? Though the point can only be finally settled by separating and isolating the two proteases, the probability is that this peptonising enzyme is a vegetable trypsin. The conclusion suggested by the observed facts is that yeast contains at any rate two proteases, the one an erepsin, the other probably a trypsin.—Mr. E. S. Salmon gave an account of his further researches on the specialisation of parasitism in the *Erysiphaceæ*. The comparative inoculation experiments of 1650 leaves of various species of *Bromus*, carried out by the author, have shown that a very high degree of specialisation has been reached in the adaptive parasitism of *Erysiphe Graminis*, DC., to the different species of the genus *Bromus*. This specialisation has involved the evolution of a considerable number of "biologic forms" of the fungus. The facts obtained show not only the high degree of specialisation which the fungus has undergone, but also that each species of *Bromus* possesses distinctive physiological characters existing concomitantly with the specific morphological characters.

Physical Society, Feb. 12.—Annual general meeting.—Dr. R. T. Glazebrook, F.R.S., president, in the chair. The president delivered an address in which he dealt with one or two matters connected with the theory of the microscope.

EDINBURGH.

Royal Society, January 4.—Prof. Duns in the chair.—In a paper on the bilateral origin of the epiphysis in the chick, Dr. John Cameron showed that the epiphysis in the chick arises in the form of two bilateral outgrowths, of which the left is by far the better marked of the two. These results correspond in their main features with those already obtained by the author in the case of the *Amphibia*. The evidence is gaining ground that the epiphysis is bilateral and not mesial in origin.—Prof. A. C. Mitchell gave an account of a multi-metre resistance bridge, which he had constructed for investigations in which very strong currents were to be used. There were some special features for securing steady pressure contact. The many standard coils which could be arranged in a great variety of ways were loosely wound in long coils, and the temperature was determined by the change of resistance of a platinum coil wound similarly in the heart of the collection of resistance coils. The coils were made of Beacon wire, and had all been carefully standardised by the Board of Trade.—Two mathematical papers by the Rev. F. H. Jackson dealt with certain fundamental power series and their differential equations, and an additional note on generalised functions of Bessel and Legendre.

January 18.—Dr. Robert Munro in the chair.—Prof. Graham Kerr read a paper on the early development of motor nerves and myotomes in *Lepidosiren paradoxa*, Fitz. Photographs taken from untouched negatives were shown illustrating the following points:—(1) the fact that the motor nerve trunks existed as metamerically repeated bridges of granular protoplasm at a period when myotome and spinal cord were still in contact; (2) that the nerve trunk was at first naked; (3) that later on it received a covering of yolk-laden mesenchymatous protoplasm which spread itself out and formed a continuous protoplasmic sheath; and (4) that at certain stages complete continuity

could be observed between motor nerve trunk and the protoplasmic body of the myoepithelial cell, of which, indeed, the former was merely a tail-like prolongation. In regard to the myotomes, it was pointed out that the greater part of the fully-formed muscle segment was derived from the outer wall of the myotome.—Dr. T. H. Bryce read a paper on the histology of the blood in the embryo of *Lepidosiren paradoxa*, part i., structure of the resting and dividing corpuscles. The material loaned by Prof. Graham Kerr is exceptionally advantageous for the study of cell structures. The large red corpuscles, 50μ in diameter, have a definite fibrillar structure, with a broad fibrillar equatorial band round the equator in the resting disc-shaped corpuscle. The nucleus has a very coarse chromatin network which stains differently from that of all the other nuclei, taking in acid and basic mixtures only the acid dye. The chromosomes in mitosis react similarly. No centrosome is present in the disc-shaped corpuscle, but it appears as a double body with exceptional distinctness in oval and round corpuscles. As all stages between the flat disc and the round corpuscles are found, it is probable that the disc rounds up before division, and as the centrosome disappears when division is even, that it is formed afresh at each division. The leucocytes are found in several varieties—a small mononuclear hyaline corpuscle, a large mononuclear form with distinct protoplasmic meshworks basophil in reaction, and polymorphonuclear granular corpuscles. The granules are eosinophil, vary much in size, and accumulate in the cytoplasm until it is entirely filled with them. These corpuscles are actively amoeboid, and each possesses a large permanent centrosome and attraction sphere, evidently related to the amoeboid movements.—A paper by Mr. E. J. Bles, on the development of *Xenopus*, was also read, and was fully illustrated by a fine series of lantern slides.

PARIS

Academy of Sciences, February 22.—M. Mascart in the chair.—On some points in the theory of algebraic functions of two variables and their integrals: Émile Picard.—Refractometric studies relating to the constitution of methinic cyano-acids: A. Haller and P. Th. Muller. The introduction of negative radicles into neutral molecules such as camphor, acetoacetic and malonic esters gives rise to substances of clearly acid function to which the name of methinic acids is applied. Ten of these compounds, in which the negative radicle is cyanogen, have been prepared and their refraction and dispersion measured, with a view to throwing light on the question as to whether they possess a ketonic or enolic constitution. It is shown that the experimental numbers approach more nearly those calculated on the assumption of the enolic formula than those required for the ketonic formula. It is possible, however, that some of the divergences noted may be due to the association of three negative groups with the same carbon atom.—On the genus *Ortmannia*, and the mutations of certain *Atydes*: E. L. Bouvier. The author regards *Ortmannia Henshawi* as being a mutation of *Atya bisulcata*, which presents the peculiarity of recalling the immediate ancestral form of the *Atya*.—The action of human serum on some pathogenic trypanosomes; the action of arsenious acid upon *Tr. gambiense*: A. Laveran. It has been shown by Dutton and Todd that the trypanosome obtained from horses in Gambia and *Tr. gambiense* are probably not identical, and the author has found that these two pathogenic trypanosomes are clearly differentiated by their reaction towards human serum. The former is clearly though slightly affected by human serum, whilst *Tr. gambiense* is completely refractory. An experimental study of the various remedies that have been suggested for the amelioration of trypanosomiasis shows that arsenious acid is the only one possessing marked effect, and this is required in large doses. It is possible that treatment with this in the early stages of sleeping sickness, before nervous lesions have commenced, may lead to a cure.—The photographic registration of the action produced by the n -rays on a small electric spark: R. Blondiot. Reproductions are given of negatives showing the increase in the actinic action of the electric spark by the action of the n -rays, and also showing that the rays emitted by a Crookes's tube are polarised. Details of the precautions necessary to obtain successful

results are also given.—The direct addition of hydrogen to aniline: the synthesis of cyclohexylamine and of two other new amines: Paul Sabatier and J. B. Senderens. The vapour of aniline, treated with an excess of hydrogen in presence of reduced nickel at 190° C., gives ammonia, cyclohexylamine, $C_6H_{11}NH_2$, dicyclohexylamine, $(C_6H_{11})_2NH$, and cyclohexylaniline, $C_6H_5.NH.C_6H_{11}$, the two latter being new. A description is given of the physical properties of these amines, together with the preparation of the carbonates and hydrochlorides.—On the soils of fossil vegetation of Sigillaria and Lepidodendron: M. Grand'Eury.—On a group of problems in geometry: C. Guichard.—On suites of analytical functions: P. Montel.—On the representation of functions by rational fractions: R. de Montessus de Ballore.—On the fragility of metals: A. Perot and Henri Michel Levy. In a former paper the authors have given a new method for measuring the effects produced by shock in notched test-pieces. In the present paper the results of the application of this method to two metals are given, and it is shown that differences in properties can be thus brought out which are not detected by the ordinary methods of testing.—The part played by the corpuscles in the formation of the anodic column in tubes of rarefied gases: H. Pellat. From the author's experiments the conclusion is drawn that the luminescence of a gas to which the name of anodic column is given follows exactly the trajectory which would be expected for the negative corpuscles, and has no relation with that of the positive ions. A reproduction of two photographs showing the appearances observed with hydrogen and oxygen tubes accompanies the paper.—The laws of the anomalous propagation of light in optical instruments: G. Sagnac.—The relation between diffusion and viscosity: J. Thover. The diffusion constant, D , and the viscosity, η , were measured for a 1 per cent. solution of phenol in various solvents, and it was found that the product $D\eta$ was a constant.—Contribution to the study of audition: M. Marage. The study of the ear in a pathological state has led the author to propose some modification in Helmholtz's theory of hearing.—On the spectrum of the arc: C. de Wetteville. The method of Fleming and Petavel, devised to study the luminous intensity of the electric arc produced by an alternating current, is applied to a study of the spectrum under similar conditions. The modifications produced are such that the arc spectrum approaches in character that of the flame spectrum.—On disruptive discharge at very high pressure: J. de Kowalski.—A new receiver for wireless telegraphy: N. Vasilescu Karpen.—On the n -rays emitted by an electric current passing through a wire: P. Jégou. The rays were put in evidence both by the effect on the lustre of phosphorescent calcium phosphide and by the action on a blue gas flame.—The study of the law of photographic development as a function of the time: Adrien Guéhard.—A new improved type of chronograph: Robert Ludwig Mond and Meyer Wildermann. In this chronograph the cylinder is fixed, and the style with the electromagnet which actuates it, rotates round the cylinder. With a cylinder 60 cm. long, a record lasting fifty minutes, and with an accuracy of $1/50$ th of a second, can be obtained.—On the specific potentialisation and the concentration of energy: Ernest Solvay.—Experimental researches on distillation: Eug. Charabot and J. Rocherolles. A study of the theory of steam distillation.—On the manganates of the alkaline earths: V. Auger and M. Billy.—The action of carbonic acid on solutions of sodium nitrite: Louis Meunier. The author controverts the conclusions of MM. C. Marie and R. Marquis, and shows that the liberation of nitrous acid in their experiments was due to the presence of potassium iodide in their solutions.—On mannamine, a new base derived from mannose: E. Roux. Mannose is converted into its oxime by means of hydroxylamine; this is reduced, and the amine separated in the form of the oxalate. Several salts and derivatives of the new base are described.—Researches on ricinine: L. Maquenne and L. Philippe. The formula $C_8H_8N_2O_2$ is ascribed to this compound, which is the methyl ester of ricinic acid. The latter acid appears to be the carboxyl derivative of an iminomethylpyridine.—On the inversion of sugar: L. Lindet.—On the simultaneous existence in living cells of diastases which possess both oxidising and reducing properties, and on the oxidising power of re-

ductases: Emm. **Pozzi-Escot**. A claim for priority as against MM. Abelous and Aloy.—On the development of the vascular cryptogams: G. **Chauveau**. The stem of the fern is constituted by the fusion of different parts, varying in number according to the level considered.—On the systematic position of the endophytes of orchids: I. **Gallaud**. Several authors have obtained from the roots of orchids fungi allied to *Fusarium*, but these would appear to have been external; the endophytic forms obtained from the cells of the orchid are distinct from *Fusarium*.—The mycelium and conidian form of the Morel: Marin **Molliard**.—On the age of the human skeletons from the caves of Mentone: Marcellin **Boule**. The skeletons would appear to be of the same age as the deposits in which they were found, corresponding to the warm and most ancient period of the Quaternary. Other skeletons found in higher layers correspond to later periods of the same formation.—On a tunnel at Oupliz-Tsike, Transcaucasia: E. A. **Martel**.—Researches on the emission of the n -rays in certain phenomena of inhibition: Aug. **Charpentier** and Ed. **Meyer**.—The action of the radium radiations on colloids, hæmoglobin, ferments, and the red corpuscles: Victor **Henri** and André **Mayer**. The β -rays, charged negatively, can precipitate positive colloids, and are without action on negative colloids. Oxyhæmoglobin from the dog and the frog is transformed into methæmoglobin and slowly precipitated; carbonoxyhæmoglobin remains unaltered. Ferments under the action of the rays slowly lose their activity, and after several days become completely inactive.—The emission of the n -rays in certain pathological cases: Gilbert **Ballet**.—The influence of the radium radiations on the toxicity of snake poison: C. **Phisalix**. The rays emitted by radium exercise an attenuating influence on snake poison, the intensity of which is a function of the time.—A physical and chemical method of recognising and measuring deep submarine currents: M. **Thoulet**.—Some new observations on phthiriosis in the vine: L. **Mangin** and P. **Viala**.—On the effects of grafting on the vine: Lucien **Daniel** and Ch. **Laurent**.

DIARY OF SOCIETIES.

THURSDAY, MARCH 3.

- ROYAL SOCIETY, at 4.30.—An Inquiry into the Nature of the Relationship between Sunspot Frequency and Terrestrial Magnetism: Dr. C. Chree, F.R.S.—The Optical Properties of Vitreous Silica: J. W. Gifford and W. A. Shenstone, F.R.S.—A Radial Area-Scale: R. W. K. Edwards.—The Origin of the Flutings in the Spectra of Antarian Stars: A. Fowler.
- ROYAL INSTITUTION, at 5.—Electrical Methods of Measuring Temperature: Prof. H. L. Callendar, F.R.S.
- RÖNTGEN SOCIETY, at 8.30.—Presidential Address: Some Laboratory Notes of the last Six Months.
- LINNEAN SOCIETY, at 8.—List of the Species of *Carex* known to occur in Malaya: C. B. Clarke, F.R.S.—On some Species of the Genus *Palæmon*, Fabr., from Tahiti, Shanghai, New Guinea, and West Africa: Dr. J. G. de Man.
- CHEMICAL SOCIETY, at 8.—Chemical Dynamics of the Alkyl Iodides: Miss K. A. Burke and F. G. Donnan.—The Constitution of Phenolphthalein: A. G. Green and A. G. Perkin.—8-Ketohexahydrobenzoic Acid: W. H. Perkin, junr.—Photochemically active Chlorine: C. H. Burgess and D. L. Chapman.

FRIDAY, MARCH 4.

- ROYAL INSTITUTION, at 9.—Breathing in Living Things: Prof. W. Stirling.
- GEOLOGISTS' ASSOCIATION, at 8.—Remarks on the British Association Geological Photographs: Dr. C. Gilbert Cullis.

SATURDAY, MARCH 5.

- ROYAL INSTITUTION, at 3.—The Life and Work of Stokes: Lord Rayleigh.

MONDAY, MARCH 7.

- ROYAL INSTITUTION, at 5.—General Monthly Meeting.
- ARISTOTELIAN SOCIETY, at 8.—Faith and the Will to Believe: L. T. Hobhouse.
- SOCIETY OF CHEMICAL INDUSTRY, at 8.—Observations on Cotton and Nitrated Cotton: H. de Mosenthal.—The Products, and Relative Temperature of Combustion of some Smokeless Powders: W. Macnab and A. E. Leighton.
- ROYAL GEOGRAPHICAL SOCIETY, at 8.30.—Journeys on the River Yalu and in Southern Manchuria: R. T. Turley.—About Korea: Rev. C. T. Collyer.
- SOCIETY OF ARTS, at 8.—Recent Advances in Electro-Chemistry: Bertram Blount. (Cantor Lecture, I).
- VICTORIA INSTITUTE, at 4.30.—Date of the Last Rise of the Land in the British Isles: Prof. E. Hull, F.R.S.

NO. 1792, VOL. 69]

TUESDAY, MARCH 8.

- ROYAL INSTITUTION, at 5.—Japanese Life and Character: E. Foxwell.
- INSTITUTION OF CIVIL ENGINEERS, at 8.—The Erection of Iron Bridges: R. S. Scholefield.
- ANTHROPOLOGICAL INSTITUTE, at 8.15.—The Gilyaks and other Tribes of Sakhalin: C. H. Hawes.

WEDNESDAY, MARCH 9.

- SOCIETY OF ARTS, at 8.—Mechanical Piano Players: J. W. Coward.
- GEOLOGICAL SOCIETY, at 8.—On the Probable Occurrence of an Eocene Outlier off the Cornish Coast: Clement Reid, F.R.S.—The Valley of the Teign: A. J. Jukes-Browne.

THURSDAY, MARCH 10.

- ROYAL INSTITUTION, at 5.—Electrical Methods of Measuring Temperature: Prof. H. L. Callendar, F.R.S.
- MATHEMATICAL SOCIETY, at 5.30.—On Inner Limiting Sets of Points: Dr. E. W. Hobson.—On the Unique Expression of a Quantic of any Order in any Number of Variables with an Application to Binary Perpetuants: Mr. P. W. Wood.—The Derivation of Generalised Bessel Coefficients from a Function Analogous to the Exponential: Rev. F. H. Jackson.—Illustrative Examples of Modes of Decay of Vibratory Motions: Prof. A. E. H. Love.
- INSTITUTION OF ELECTRICAL ENGINEERS, at 8.—The Railway Electrification Problem and its Probable Cost for England and Wales: F. F. Bennett.—The Rated Speed of Electric Motors as affecting the Type to be Employed: H. M. Hobart.
- SOCIETY OF ARTS, at 4.30.—China Grass; its Past, Present, and Future: Frank Birdwood.

FRIDAY, MARCH 11.

- ROYAL INSTITUTION, at 9.—The Motion of Viscous Substances: Prof. F. T. Trouton, F.R.S.
- INSTITUTION OF CIVIL ENGINEERS, at 8.—The Premium System of Payment for Labour: W. G. Banister.
- PHYSICAL SOCIETY, at 8.
- MALACOLOGICAL SOCIETY, at 5.—A *Résumé* of Recent Researches on the Structure of Pelecypod Gills: Dr. W. G. Ridewood.—Descriptions of two new Species of *Opisthostoma* from Borneo: E. A. Smith.—On some Non-Marine Hawaiian Mollusca: C. F. Ancey.—New Species of Mollusca from New Zealand: Rev. W. H. Webster.

SATURDAY, MARCH 12.

- ROYAL INSTITUTION, at 3.—The Life and Work of Stokes: Lord Rayleigh.

CONTENTS.

PAGE

The History of Elementary Mathematics. By G. B. M.	409
The Practical Methods of Fractional Distillation. By E. C. C. B.	410
A French Manual of Forestry. By Prof. W. R. Fisher	410
Our Book Shelf:—	
Workman: "The School Arithmetic: being a School Course adapted from 'The Tutorial Arithmetic'".	411
Wilson: "Free-hand Lettering; being a Treatise on Plain Lettering from the Practical Standpoint for Use in Engineering Schools and Colleges"	411
Buchanan and Gregory: "Junior Country Reader"	411
Hudson: "Green Mansions: a Romance of the Tropical Forest"	411
Letters to the Editor:—	
The Blondlot n -Rays.—A. A. Campbell Swinton	412
Chalk-stuff Gas.—Prof. Henry E. Armstrong, F.R.S.; Prof. Arthur Smithells, F.R.S.	412
Variation in Oat Hybrids.—John H. Wilson	413
Visitors from the High North in Central Italy.—Prof. Henry H. Giglioli	413
The New Buildings at Cambridge. (<i>Illustrated</i>).	413
Education and Progress in Japan. By A. T. Simmons	416
The Evolution of Matter as Revealed by the Radio-active Elements	418
Lieut. General C. A. McMahon, F.R.S. By H. W. B.	419
The New Education Authority for London	420
Notes	421
Our Astronomical Column:—	
Astronomical Occurrences in March	424
Variability of Minor Planets	424
Observations of Venus during 1903	424
Catalogue of New Double Stars	425
Notes on the History of the Metrical Measures and Weights. By Prof. Herbert McLeod, F.R.S.	425
University and Educational Intelligence	427
Societies and Academies	429
Diary of Societies	432